

present invention converts raw nucleotide sequence data into repeat sequence designations. FIG. 4A shows nine different repeat sequences 402 that are each 24 base pairs long. These repeat sequences 402 are given as examples of repeat sequences which have been previously been found to occur in the X_r region of the protein A gene for various isolates of *S. aureus*. Each one of these unique repeat sequences 402 is assigned a cassette designation 400 which in this example is simply a single letter code that represents the corresponding sequence. For example, the nine repeat sequences 400 shown in FIG. 4A are labeled 'T' SEQ ID NO: 1, 'A' SEQ ID NO: 2, 'B' SEQ ID NO: 3, 'E' SEQ ID NO: 4, 'G' SEQ ID NO: 5, 'D' SEQ ID NO: 6, 'J' SEQ ID NO: 7, 'K' SEQ ID NO: 8 and 'M' SEQ ID NO: 9. Other codes may be used besides a single letter, such as a combination of letters and numbers.

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FIG. 4B depicts an example of a sequence 404 SEQ ID NO: 10 that was obtained by sequencing the X_r region of the protein A gene of a bacterial isolate. The software scans the sequence data 404, identifies know repeat sequences, and converts the nucleotide data 404 into a string of cassette designations 406. A particular pattern of cassette designations 406 shows the following repeat motif: "TJMEMDMGMK" SEQ ID NOS: 1, 7, 9, 4, 9, 6, 9, 5, 9, 8.

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FIG. 5 depicts a block diagram illustrating a series of isolates that has been converted into repeat sequence designations. Sequences 500-516 illustrates an example of a sequence that was

obtained by sequencing the X_r region of the protein A gene of an *S. aureus* isolate, and converted into repeat sequence designations. As can be seen, sequence 502 SEQ ID NOS: 1, 7, 9, 3, 9, 6, 9, 5, 9, 8 is identical to sequence 500 SEQ ID NOS: 1, 7, 9, 4, 9, 6, 9, 5, 9, 8 with the exception that the fourth cassette 'E' in sequence 500 has been replaced by a 'B'.

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Comparing sequences 504 SEQ ID NOS: 1, 7, 9, 4, 1, 6, 9, 5, 8 and 500: one 'M' cassette in sequence 500 has changed to a 'T' cassette in sequence 504, and one 'M' cassette in sequence 500 has been deleted. Thus, there are two discrete events separating sequences 504 and 500.

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Comparing sequences 506 SEQ ID NOS: 1, 7, 9, 3, 9, 6, 9, 5, 5, 9, 8 and 500: one 'E' cassette in sequence 500 has changed to a 'B' cassette in sequence 506. So sequences 500 and 506 are separated by two discrete events.

Marked-up version of Specification

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FIGS. 4A and 4B depict an example of how server 118 operating the software of the present invention converts raw nucleotide sequence data into repeat sequence designations.

FIG. 4A shows nine different repeat sequences 402 that are each 24 base pairs long. These repeat sequences 402 are given as examples of repeat sequences which have been previously been found to occur in the X_r region of the protein A gene for various isolates of *S. aureas*. Each one of these unique repeat sequences 402 is assigned a cassette designation 400 which in this example is simply a single letter code that represents the corresponding sequence. For example, the nine repeat sequences 400 shown in FIG. 4A are labeled 'T' SEQ ID NO: 1, 'A' SEQ ID NO: 2, 'B' SEQ ID NO: 3, 'E' SEQ ID NO: 4, 'G' SEQ ID NO: 5, 'D' SEQ ID NO: 6, 'J' SEQ ID NO: 7, 'K' SEQ ID NO: 8 and 'M' SEQ ID NO: 9. Other codes may be used besides a single letter, such as a combination of letters and numbers.

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FIG. 4B depicts an example of a sequence 404 SEQ ID NO: 10 that was obtained by sequencing the X_r region of the protein A gene of a bacterial isolate. The software scans the sequence data 404, identifies know repeat sequences, and converts the nucleotide data 404 into a string of cassette designations 406. A particular pattern of cassette designations 406 shows the following repeat motif: "TJMEMDMGMK" SEQ ID NOS: 1, 7, 9, 4, 9, 6, 9, 5, 9, 8.

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FIG. 5 depicts a block diagram illustrating a series of isolates that has been converted into repeat sequence designations. Sequences 500-516 illustrates an example of a sequence that was obtained by sequencing the X_r region of the protein A gene of an *S. aureus* isolate, and converted